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THE HORSE AND THE FARM TRACTOR.

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The same economic forces that caused the horse to supersede the ox as a source of farm power in the nineteenth century are now working to displace the horse with the tractor. The tractor has proved its value on the American farm. But whether it will ever displace a majority of the farm horses depends upon economic conditions and further developments in the tractor world.

The power that will enable the farmer to produce the most at the cheapest cost is obviously the power that will survive. A comparison of the horse and the tractor may be made on the following basis:

1. Economy.
2. Efficiency.
3. Adaptability.

ECONOMY.

The average annual cost of a farm tractor on 54 farms in Pennsylvania in 1917 was \$495.62, or, including the labor of operator, \$622.12.¹ As far as the farm business is concerned, these figures are of little value until we know how the farm business is affected. It is evident if the tractor is to be a good business proposition that this additional cost must be met with a corresponding decreased cost in some other part of the business. A tractor may be able to plow at half the cost of doing the same work with horses and still be a poor business proposition if the horses were to stand in the barn while the tractor worked.

The principal factors affecting economy are number of horses displaced, feed and other saving on remaining horses, and labor saved. The 1917 Pennsylvania data on farms raising the same acreage of the various crops as before purchasing the tractor showed a displacement of 1.8 horses. Preliminary figures for 1918 on somewhat smaller farms show a similar displacement of 1.5 horses. The number of horses displaced depends upon the size of the farm and the kind of

¹ Bulletin 158, Pennsylvania State College.

work to be done. On large farms, the tractor can displace more horses than on small farms. If the tractor does not reduce the burden on the horses at the time when the horse labor is busiest, no horses can be disposed of. In other words, if it is necessary to keep horses sufficient for the farm needs to do the work of a certain season, a tractor would be unnecessary and unprofitable. If the tractor can do the work of the rush season, then a part of the horses may be sold.

Besides getting along with less horses, the tractor owner may save in feed and other costs on the remaining horses. If the tractor does the heavy work, the horses will require less feed for the remaining lighter work. The Pennsylvania 1918 data show an annual saving of feed on the remaining horses of \$59.40 per farm.

The tractor does work faster than horses and thereby saves man labor on many kinds of work. Some farmers hire less help while others have more time for other work. The 1918 Pennsylvania data on farms having the same organization since buying the tractor show a saving of three months of labor because of the tractor. Current 1918 wage for labor without board for the section studied was about \$60 per month. Thus, three months of labor worth \$180 were saved.

The situation of these farms may be summarized as follows:

Annual cost of tractor (1917 data)	\$495.62
Labor saved (1918 data)	\$180.00
Feed saved (1918 data)	59.40
Balance to offset cost of horses displaced	256.22
Cost of tractor operation per horse displaced.....	170.81

The net cost of keeping a horse in New York State as shown in U. S. D. A. 560 for 1911 to 1914 inclusive was \$145.02. Since that period, there has been a sharp increase in the cost of keeping a horse. Unquestionably, the tractor is a profitable proposition on these farms.

EFFICIENCY.

The tractor has proved its efficiency in a variety of farm work. The term efficiency is here taken in the broader sense of the farm as a unit. If the tractor can improve the efficiency of the farm, its use is justified even though it is not accompanied by a decrease in cost. The farm efficiency may be improved by doing the work in the optimum season, by changing the organization to accommodate a more profitable combination of enterprises, by increasing the magnitude of business either by larger acreage or more intensive enterprises. In

the same way that the gang plow, the mower, the binder and similar implements have increased the production per man the tractor can increase the farmers' efficiency. This has been a large factor in the rapid increase in the number of tractors on farms. The full development hinges on the development of more suitable tractor machinery.

ADAPTABILITY.

The displacement of the horse to any full extent depends upon the adaptability of the tractor to all kinds of farm work. The horse is a flexible source of farm power, useful singly or in teams of two or more, and dependable under almost all conditions that the farm demands. The tractor, while its performance has been almost unbelievable, has not proved its superiority to the horse as an all around farm power. But, as necessity is the mother of invention, if there is an economic justification we may expect rapid strides in this direction.

Farm Management Extension Conference.

A conference of the Farm Management Demonstrators from the Northern and Western States was held in Washington, June 15 to 22. Twenty-five of the thirty-three Northern and Western States were represented and four of the Southern States had representatives present. Among the speakers outside of the States Relations Service and Office of Farm Management were Professor G. F. Warren of Cornell University, who talked on "Probable Future Trend of Prices" and "The Choice of Farm Enterprises Based on Prices"; Professor Andrew Boss of the University of Minnesota, who talked on "The Choice of Crop Enterprises Based on Returns for Labor" and "The Choice of Farm Enterprises Based on Labor Requirements"; Dr. Francis Walker of the Federal Trade Commission, who discussed the "Theory Concerning Cost of Production Studies"; and Dr. B. H. Hibbard of the University of Wisconsin, who discussed "Farm Credits" and "Marketing of Farm Products." A number of the men in Washington discussed various extension and investigation topics. Considerable time was spent in round table discussion of topics relating to the work of the farm management demonstrator. It was the consensus of opinion of the men present that a full and profitable week was spent at the conference.